

Attachment A

Flow Frequency Memorandum

MEMORANDUM

DEPARTMENT OF ENVIRONMENTAL QUALITY - WATER DIVISION 3019 Peters Creek Road Roanoke, Virginia 24019

SUBJECT: Flow Frequency Determination
Glen Wilton WWTP, VA0089273

TO: Permit File

FROM: Becky L. France, Water Permit Writer *BLF*

DATE: September 30, 2015

Glen Wilton WWTP discharges to the James River near Iron Gate, Virginia. Stream flow frequencies are required to develop effluent limitations for the VPDES permit. This memo supercedes the August 12, 2010.

The Virginia DEQ has operated a continuous record gauge on the James River near Lick Run, Virginia (#02016500) since 1925. The gauge is approximately 2.0 miles upstream of the discharge point. Flows at the gauging station have been regulated since 1979 by Lake Moomaw. The flow frequencies for the gauge are based on the regulated period of record from 1980 through 2011. The values at the discharge point were determined by drainage area proportions and do not address any withdrawals, discharges, or springs lying between the gauge and the discharge point.

The high flow months are January through May. Flow frequencies are listed on the attached table.

Flow Frequency Determination: Glen Wilton WWTP

Reference Gauge (data from 1980 to 2011)
James River, VA (#02016500)

	Drainage Area [mi^2]	ft $^3/\text{s}$	MGD	ft $^3/\text{s}$	MGD
1Q10 =	182	118	High Flow 1Q10 =	325	210
7Q10 =	191	123	High Flow 7Q10 =	393	254
30Q5 =	239	154	HM =	745	481
30Q10=	212	137	High Flow 3010=	479	310

Flow frequencies for the reissued permit
James River at Discharge Point 4/20/16

	Drainage Area [mi^2]	ft $^3/\text{s}$	MGD	ft $^3/\text{s}$	MGD
			1,371.0		1,381.0
1Q10 =		183	118	High Flow 1Q10 =	327
7Q10 =		192	124	High Flow 7Q10 =	396
30Q5 =		241	156	HM =	750
30Q10=		214	138	High Flow 30Q10=	482
					312

SITEID	NAME	RECORD	River	LATLONG	DAAREA	HARMEAN	HF30Q10	HF7Q10	HF1Q10	Z30Q05	Z30Q10	Z7Q10	Z1Q10	Z1Q30	HFMTHS	Statperiod	Yrstrn	Notes
02016500	James River at Lick Run, Va.	R, 1925-	James River	Lat 37°46'25", Long 79°47'04", NAD 83	1371	745	479	393	325	239	212	191	182	200	JAN-MAY	1980-2005	2011	Flow regulated by Lake Moomaw since Dec 1979

Attachment B

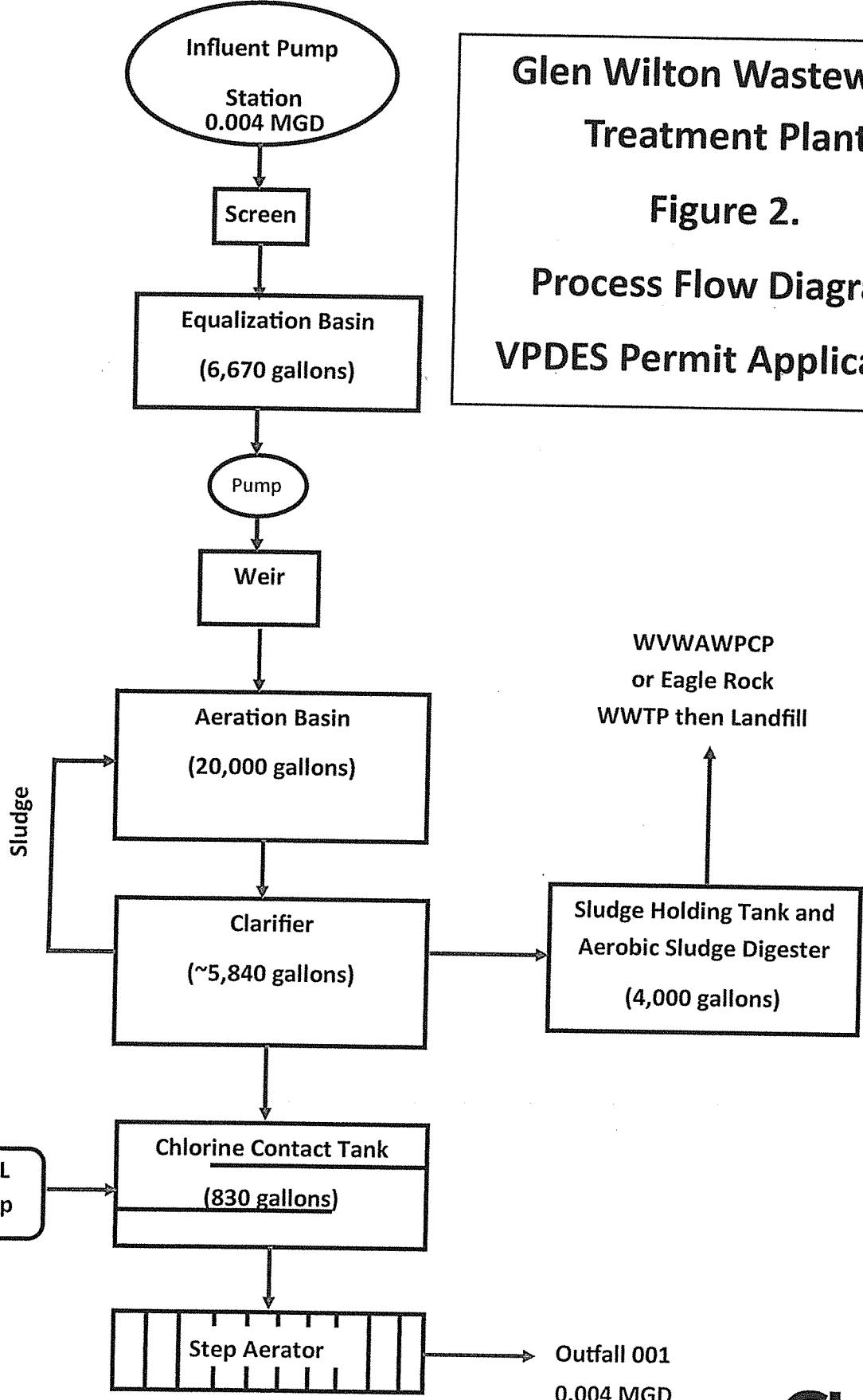
Wastewater Schematic

Glen Wilton Wastewater Treatment Plant

Figure 2.

Process Flow Diagram

VPDES Permit Application



JN: 30314

August 2015

Attachment C

Site Inspection Report

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Site Inspection Report for Glen Wilton WWTP
Reissuance of VPDES Permit No. VA0089273

TO: Permit File

FROM: Becky L. France, Water Permit Writer *BLF*

DATE October 5, 2015

On August 7, 2015, I conducted a site visit of Glen Wilton WWTP. Mr. Paul Peery, Utility Supervisor, was present at the inspection. The facility is located on 358 Railway Road and serves approximately 40 residences in the Glen Wilton community.

The extended aeration system consists of an equalization basin, aeration basin with air diffusers, clarifier, sludge holding tank, chlorinator, baffled chlorine contact tank, and step aerator.

The wastewater gravity flows from the residences to a pump station which contains grinder pumps. Wastewater from the pump station is periodically discharged to the plant where it flows through a bar screen and into an equalization basin. The 6,670 gallon equalization basin has a blower unit and a backup air supply line. A float switch governs the transfer of the wastewater into a flow control box which has an adjustable overflow weir. Wastewater from the equalization tank enters the aeration tank through the flow control box. At the time of the site visit, the activated sludge appeared a medium chocolate brown.

The mixed liquor enters one of two clarifiers through a port in the aeration tank and is distributed across the clarifier via a trough. A skimmer removes debris from the surface of the clarifier and discharges it into the sludge tank. The clarifier tank has two hoppers and three air lift pumps. Two of the air lift pumps remove sludge for wasting or return, and the third pump removes floating scum from the surface. These air lift pumps operate when the blowers are operating. Routinely, the heavier sludge will be returned continuously from the first hopper (nearest the distribution trough), and the lighter sludge is wasted daily from the second hopper.

Sludge enters the sludge holding tank where it is mixed and aerated by a coarse bubble diffuser. The permittee's sludge management plan includes options for either hauling to the Botetourt County Landfill or the WVWA WPCP for further processing.

Prior to hauling to the landfill, the digested sludge will be dewatered with a portable plate and frame press. A submersible pump is used to pump the sludge to a flocculation tank where it is mixed with polymer and allowed to flocculate. The flocculated sludge is drawn into the press under pressure via a feed pump. The sludge enters the recessed fabric covered plates and is captured between the recessed area while the filtrate passes through the filter cloth and leaves the press through piping and is returned to the aeration basin. Air passages between the plates to facilitate further drying and manual removal of the sludge. This sludge is collected in a sludge hopper and stored on plastic sheeting or plastic garbage bags in a truck bed for disposal in the Botetourt County Sanitary Landfill.

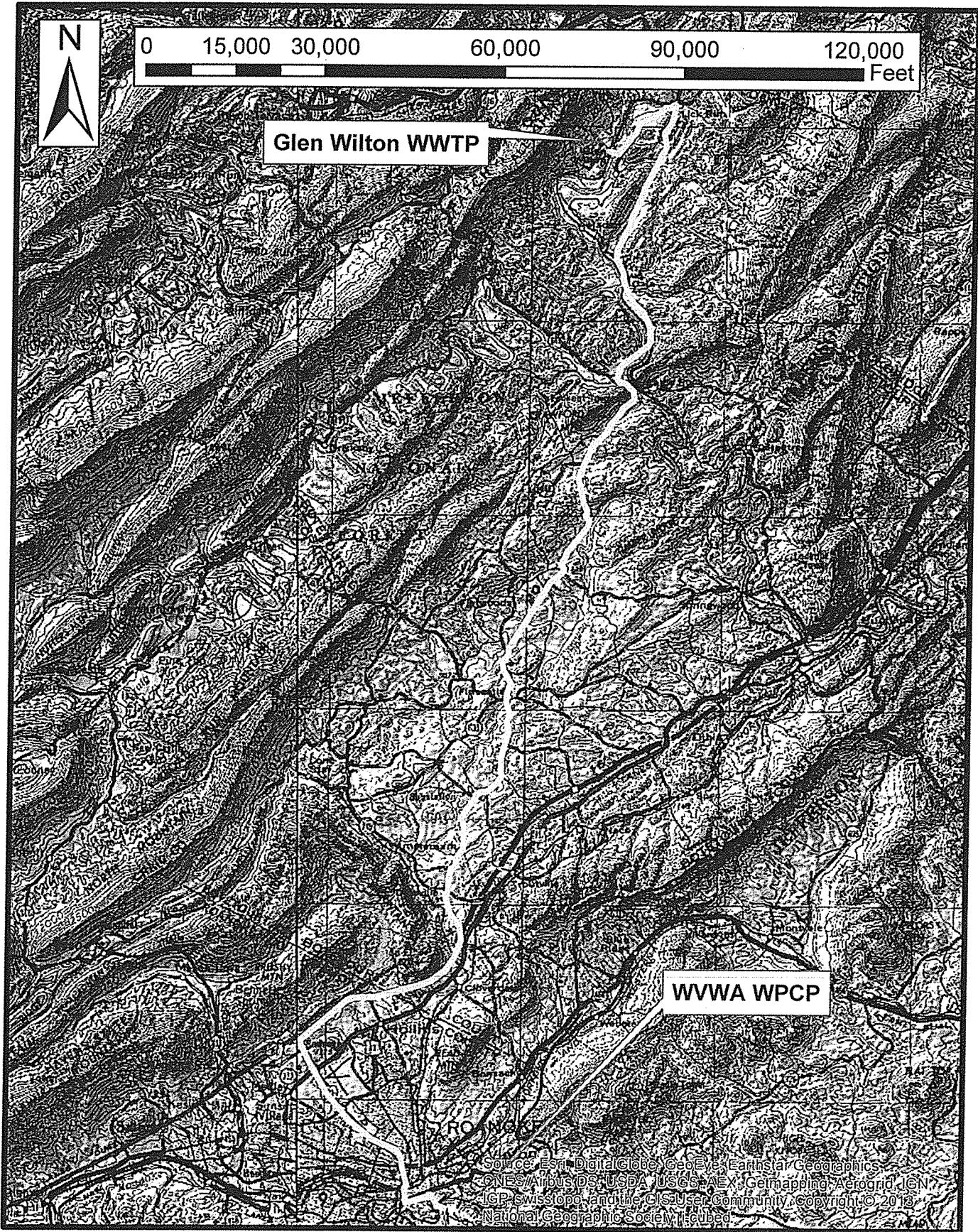
Site Inspection Report
Glen Wilton WWTP
October 5, 2015
Page 2 of 2

Flow leaves the clarifier via a weir box and is routed to the chlorine contact tank for disinfection. A sodium hypochlorite solution is fed from a solution tank into a contact tank by a metering pump with a variable output. Sodium hypochlorite solution is kept in a storage building. Disinfected effluent flows through a cascade aerator and is discharged through a pipe which leads to the James River. At the time of the site visit the effluent appeared clear without any significant visible solids.

The effluent is piped via gravity approximately 500 feet to the James River. The effluent is discharged through a concrete pipe along a riprapped area into the James River. At the time of the site visit, there were no noticeable solids being discharged. The James River was about 150 feet wide and the river bed was reported to contain silt with some small rocks.

Attachment D

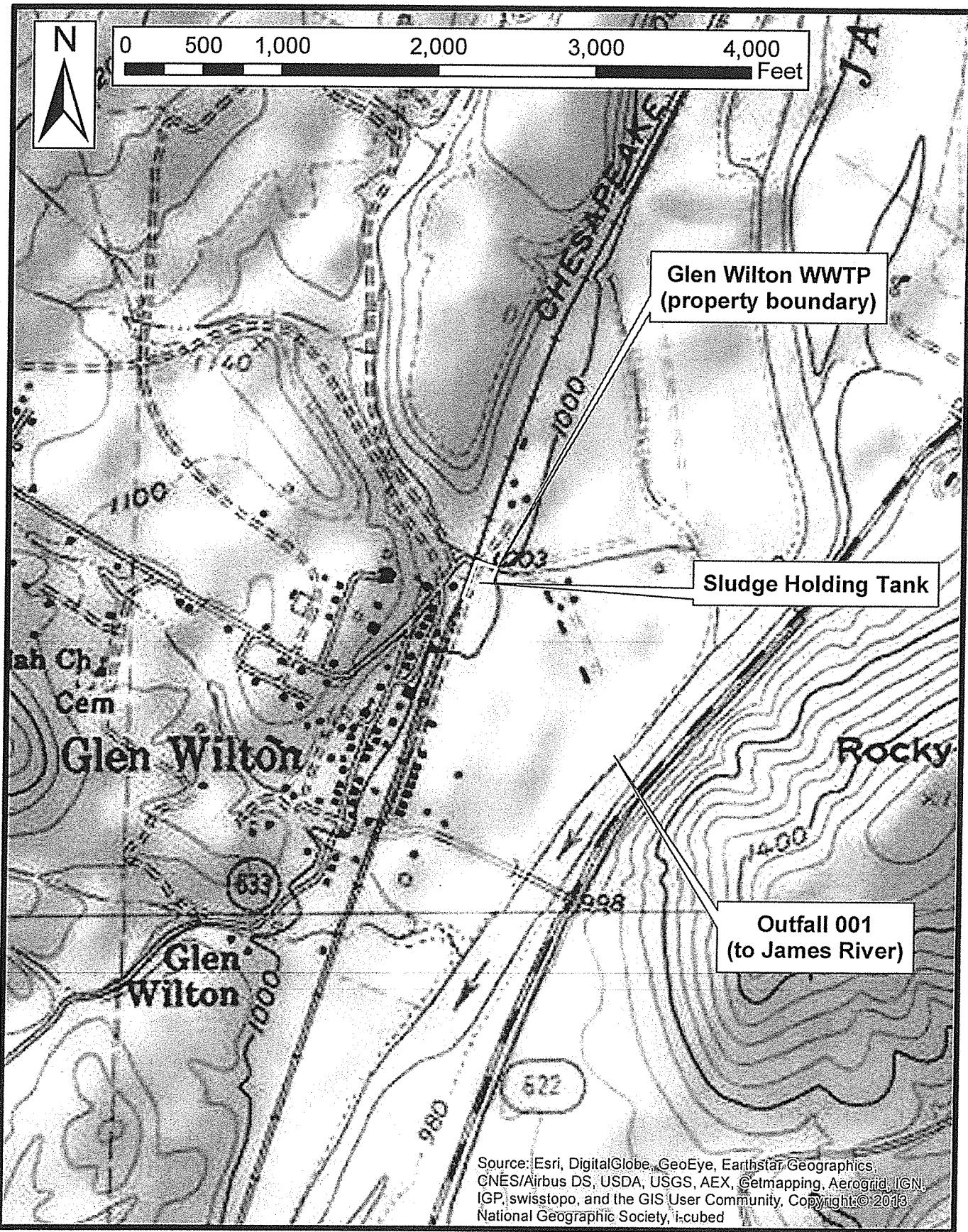
USGS Topographic Map



JN 30314
August 2015

Western Virginia Water Authority
Glen Wilton Wastewater Treatment Plant
VPDES Permit Application
Figure 3. Haul Routes





JN 30314
July 2015

Western Virginia Water Authority
Glen Wilton Wastewater Treatment Plant
VPDES Permit Application
Figure 1



Attachment E

Ambient Water Quality Information

- STORET Data (Station 2-JMS345.73)**
- 2012 Impaired Waters Fact Sheet
(Excerpt)**

STORET Staion 2-JMS345.73 (Route 220 bridge near confluence with Cowpasture Creek)
 VAW-I18R

Collection Date Time	Temp Celsius	pH (S.U.)	
07/12/2005 10:30	24.1	7.9	
11/09/2005 09:00	12.8	8	
01/24/2006 10:00	5.6	7.8	
03/30/2006 10:00	9	7.4	
05/01/2006 10:30	15	6.9	
07/31/2006 10:30	25.2	6.8	
09/07/2006 10:00	19.8	8.3	
11/14/2006 14:30	11	8.3	
02/17/2011 10:00	6.2	8	
04/20/2011 12:50	12.7	7.8	
06/23/2011 10:15	24	7.3	
08/17/2011 10:45	22.5	7.8	
10/13/2011 12:05	17.6	8	
12/29/2011 12:50	4.4	7.4	
02/22/2012 11:20	6	7.4	
03/08/2012 10:55	9.5	6.7	
05/24/2012 11:35	18	8.1	
07/05/2012 11:00	26.1	8	
09/05/2012 12:10	24.2	8	
11/27/2012 10:00	7.3	7.1	
02/12/2013 09:30	5.3	7.5	
04/02/2013 10:00	7.2	7.4	
06/18/2013 10:35	19.6	7.5	
08/13/2013 11:30	23.8	7.7	
10/02/2013 11:10	18.5	7.7	
12/16/2013 10:20	4.6	7.2	
02/05/2014 10:25	3.8	7.5	pH 90th Percentile
04/01/2014 12:45	10.2	8	pH 10th Percentile
06/16/2014 11:45	23.5	8	Temperature 90th percentile
08/04/2014 10:20	21.9	8.1	Temperature 90th Percentile (Jan. - May)
10/20/2014 12:20	13.33	NULL	
12/01/2014 13:50	8.28	7.84	
01/13/2015 09:35	2.31	7.12	
03/09/2015 09:45	4.27	7.29	
05/07/2015 11:15	18.27	7.83	

8.1 S.U.

7.1 S.U.

24.1 °C

16.8 °C



2012 Impaired Waters

Categories 4 and 5 by DCR Watershed*

James River Basin

Fact Sheet prepared for DCR Watershed: H01*

Cause Group Code: H03R-04-PCB **James River**

Location: The James River from Big Island dam (below Blue Ridge Parkway) downstream to the I-95 bridge James River Bridge in Richmond including its tributaries Hardware River up to Rt. 6 bridge and Slate River up the Rt. 676 bridge.

City / County: Amherst Co. Bedford Co.

Use(s): Fish Consumption

Cause(s) /

VA Category: PCB in Fish Tissue/ 5A

The rivers are considered impaired of the Fish Consumption Use due to a VDH fish consumption restriction for PCBs. No more than two meals/month of gizzard shad, carp, American eel, flathead catfish, or quillback carpsucker are recommended.

Visit the VDH website for more details:

<http://www.vdh.state.va.us/HHControl/fishingadvisories.asp>

A portion of the segment was first listed in the 2004 segment but was expanded during the 2006 cycle based on the current condemnation (12/13/2004). The original 2016 TMDL due date was maintained.

The impairment is based on the results of DEQ's fish tissue monitoring program which indicated PCB exceedances at multiple stations including 2-JMS157.28, 2BJMS118.99, 2-JMS127.50, 2CJMS110.00 and 2-JMS258.54 with PCBs in 4 Species, 2-JMS213.00 (2005 FT/Sediment) with PCBs in 3 Species and 2-JMS176.63 (2005 FT/Sediment) with PCBs in 2 Species.

Assessment Unit / Water Name / Description	Cause Category / Name	Nested	Cycle First Listed	TMDL Schedule or EPA Approval	Size
VAW-H01R_JMS01A00 / James River / James River mainstem from the mouth of Wilderness Creek downstream to Holcomb Rock Dam.	5A PCB in Fish Tissue		2006	2016	1.34
VAW-H01R_JMS01A04 / James River / The James River from the upstream ending of the WQS PWS designation (37°30'08.38"/79°01'18.18") downstream to the mouth of Wilderness Creek.	5A PCB in Fish Tissue		2006	2016	0.71
VAW-H01R_JMS02A00 / James River / James River mainstem from the Georgia Pacific outfalls downstream to the upstream ending of the WQS PWS designation (37°30'08.38"/79°01'18.18")	5A PCB in Fish Tissue		2006	2016	4.03
VAW-H01R_JMS03A00 / James River / James River mainstem from the mouth of Hunting Creek downstream to the Georgia Pacific outfalls on the James River.	5A PCB in Fish Tissue		2006	2016	0.28

James River

DCR Watershed: H01*

Fish Consumption

Estuary (Sq. Miles) Reservoir (Acres) River (Miles)

PCB in Fish Tissue - Total Impaired Size by Water Type:

6.36

Attachment F

Wasteload and Limit Calculations

- **MIXING Zone Calculations (MIXER 2.1)**
- **Effluent Data (flow, pH, temperature)**
- **Antidegradation Wasteload Allocation Spreadsheet**
- **STATS Program Outputs (ammonia, TRC)**

Mixing Zone Predictions for Glen Wilton WWTP

Effluent Flow = 0.020 MGD
Stream 7Q10 = 124 MGD
Stream 30Q10 = 138 MGD
Stream 1Q10 = 118 MGD
Stream slope = 0.0075 ft/ft
Stream width = 150 ft
Bottom scale = 4
Channel scale = 1

Mixing Zone Predictions @ 7Q10

Depth = 1.2256 ft
Length = 14094.32 ft
Velocity = 1.0442 ft/sec
Residence Time = .1562 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 7Q10 may be used.

Mixing Zone Predictions @ 30Q10

Depth = 1.3074 ft
Length = 13346.18 ft
Velocity = 1.0894 ft/sec
Residence Time = .1418 days

Recommendation:

A complete mix assumption is appropriate for this situation and the entire 30Q10 may be used.

Mixing Zone Predictions @ 1Q10

Depth = 1.1895 ft
Length = 14455.16 ft
Velocity = 1.0239 ft/sec
Residence Time = 3.9215 hours

Recommendation:

A complete mix assumption is appropriate for this situation providing no more than 25.5% of the 1Q10 is used.

Glen Wilton WWTP (VA0089273)

Effluent pH (S.U.)

Date Due	min	max		
10-Jun-11	7	7.4		
10-Jul-11	7.2	7.5		
10-Aug-11	7.2	7.4		
10-Sep-11	7	7.3		
10-Oct-11	6.9	7.2		
10-Nov-11	7	7.1		
10-Dec-11	6.9	7.1		
10-Jan-12	6.9	7.2		
10-Feb-12	7	7.1		
10-Mar-12	7	7.1		
10-Apr-12	7.1	7.4		
10-May-12	7.3	7.6		
10-Jun-12	7.2	7.7		
10-Jul-12	7.3	7.5		
10-Aug-12	7.3	7.5		
10-Sep-12	7.4	7.5		
10-Oct-12	7.3	7.5		
10-Nov-12	7.3	7.4		
10-Dec-12	7.2	7.3		
10-Jan-13	7.2	7.7		
10-Feb-13	7.1	7.5		
10-Mar-13	7.3	7.7		
10-Apr-13	7.1	7.8		
10-May-13	7.1	7.3		
10-Jun-13	7.1	7.3		
10-Jul-13	7.3	7.7		
10-Aug-13	7.4	7.7		
10-Sep-13	7.3	7.4		
10-Oct-13	7.3	7.4		
10-Nov-13	7.1	7.9		
10-Dec-13	7	7.4		
10-Jan-14	7	7.2		
10-Feb-14	7.1	7.3		
10-Mar-14	7	7.2		
10-Apr-14	6.9	7.1		
10-May-14	7	7.5	90th Percentile pH	7.7 S.U.
10-Jun-14	7.1	7.5	10th Percentile pH	6.9 S.U.
10-Jul-14	7.5	7.8		
10-Aug-14	7.2	7.5		
10-Sep-14	6.9	7.1		
10-Oct-14	7	7.1		
10-Nov-14	7.1	7.3		
10-Dec-14	7.1	7.7		
10-Jan-15	7	7.6		
10-Feb-15	7	7.8		
10-Mar-15	6.8	7.2		
10-Apr-15	7	7.5		
10-May-15	7	7.4		
10-Jun-15	7	7.2		
10-Jul-15	7	7.2		

Glen Wilton WWTP
VA0089273

Effluent Temperature Data for 90th Percentile Calculation

Days	Jul-14	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15
1		21	23	20.4		11.2				17.1		22.4
2	23.3					11.0	10	10.3				
3			23.5	20	12.4					17.9		20.5
4	23	22						7.5	7.8			
5			22		16.4		9.6					20.0
6		21.9		15					8.6	15.5	15.4	
7	23.6				13.6		9.4					
8		22.1	22	18.3						17.6	22.0	
9	24.3						9.1		9.8	18.4		
10		22	21.9	16.7		12.1						
11	23							9.5	10.1		18.7	
12		22	22.4		13.4	12.5	10.3		9.3	10.4		18.6
13				17								
14	23				12.3		9.3					
15			20.4	19.5		11.4				19.2	18.4	
16	22.4						8	2	11.3			
17			21.7	20	15.3							23.3
18	22.4	22.3			8.2	10.1	9.6		5.8	9.8		19.0
19			20						5.6	9.5		22.5
20		22.9		14							19.1	
21	22.1				13.0		8.4					
22		22.5	20	16.5		10.4				18.1		22.3
23	23.4						9.3	6.7	10.3			
24			18.2	15.8	10	11.1				17.8		23.4
25	24	22.6									19.3	
26			20		11	9.0	10.3					22.5
27		21.6		15.5					11.6	16.0		
28	23.6				10		7.6					
29		22.5	19	15.7		9.2					22.2	21.5
30	22.7					9.2			11.4	12.8		
31				13.2		9.4						

90th percentile 23 °C
90th percentile 19 °C January - May

Glen Wilton WWTP
VA0089273

DMR Flow Data

Date DMR Due	Flow Monthly Average (MGD)	Flow Weekly Ave (MGD)
10-Aug-12	0.0023	0.0036
10-Sep-12	0.0024	0.0052
10-Oct-12	0.0031	0.0148
10-Nov-12	0.0023	0.0035
10-Dec-12	0.0021	0.0029
10-Jan-13	0.0028	0.0045
10-Feb-13	0.006	0.058
10-Mar-13	0.003	0.0082
10-Apr-13	0.003	0.0126
10-May-13	0.0136	0.084
10-Jun-13	0.01	0.0758
10-Jul-13	0.0058	0.035
10-Aug-13	0.0079	0.048
10-Sep-13	0.0029	0.0132
10-Oct-13	0.0023	0.0054
10-Nov-13	0.0031	0.0066
10-Dec-13	0.0027	0.0093
10-Jan-14	0.0093	0.0517
10-Feb-14	0.0032	0.02
10-Mar-14	0.0057	0.0261
10-Apr-14	0.0031	0.01
10-May-14	0.0036	0.0199
10-Jun-14	0.0033	0.0103
10-Jul-14	0.0012	0.0034
10-Aug-14	0.0037	0.027
10-Sep-14	0.0013	0.0024
10-Oct-14	0.0013	0.0025
10-Nov-14	0.0025	0.0079
10-Dec-14	0.0022	0.005
10-Jan-15	0.0026	0.0048
10-Feb-15	0.0028	0.0079
10-Mar-15	0.0025	0.0035
10-Apr-15	0.01	0.0211
10-May-15	0.0081	0.0414
10-Jun-15	0.0027	0.0836
10-Jul-15	0.0022	0.0048
mean	0.0041	0.021
maximum	0.014	0.084
minimum	0.0012	0.0024
permit limit	0.020	

**FRESHWATER
WATER QUALITY CRITERIA / WASTELOAD ALLOCATION ANALYSIS**

Facility Name: Glen Wilton WWTP
 Receiving Stream: James River, Upper

Permit No.: VA0089273

Version: OWP Guidance Memo 00-2011 (8/24/00)

Stream Information

Mean Hardness (as CaCO ₃) =	50 mg/L	Stream Flows	Mixing Information	Effluent Information
90% Temperature (Annual) =	24.1 deg C	1Q10 (Annual) = 118 MGD	Annual - 1Q10 Mix = 25.5 %	Mean Hardness (as CaCO ₃) = 50 mg/L
90% Temperature (Wet season) =	16.8 deg C	7Q10 (Annual) = 124 MGD	-7Q10 Mix = 100 %	90% Temp (Annual) = 23 deg C
90% Maximum pH =	8.1 SU	30Q10 (Annual) = 138 MGD	-30Q10 Mix = 100 %	90% Temp (Wet season) = 19 deg C
10% Maximum pH =	7.1 SU	1Q10 (Wet season) = 212 MGD	Wet Season - 1Q10 Mix = 100 %	90% Maximum pH = 7.7 SU
Tier Designation (1 or 2) =	2	30Q10 (Wet season) = 312 MGD	-30Q10 Mix = 100 %	10% Maximum pH = 6.9 SU
Public Water Supply (PWS) Y/N? =	n	30Q5 = 156 MGD	Discharge Flow = 0.02 MGD	
Trout Present Y/N? =	n	Harmonic Mean = 485 MGD		
Early Life Stages Present Y/N? =	y	Annual Average = MGD		

Water Quality Criteria

Parameter	Background Conc.	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)
Aceraphene	0	—	—	na	2.7E+03	—	na	2.1E+07	—	na	2.7E+02	—	na	2.1E+06	—	na	—	—	na	—	2.1E+06	
Acrolein	0	—	—	na	7.8E+02	—	na	6.1E+06	—	na	7.8E+01	—	na	6.1E+05	—	na	—	—	na	—	6.1E+05	
Acrylonitrile c	0	—	—	na	6.6E+00	—	na	1.6E+05	—	na	6.6E+01	—	na	1.6E+04	—	na	—	—	na	—	1.6E+04	
Aldrin c	0	3.0E+00	—	na	1.4E-03	4.5E+03	—	na	3.4E+01	7.5E-01	na	1.4E-04	4.4E+03	—	na	3.4E+00	4.4E+03	—	na	—	3.4E+00	
Ammonia-N (mg/l) (Yearly)	0	6.95E+00	1.13E+00	na	—	1.0E+04	7.8E+03	na	—	1.74E+00	2.83E-01	na	—	1.0E+04	2.0E+03	na	—	1.0E+04	2.0E+03	na	—	—
Ammonia-N (mg/l) (High Flow)	0	6.95E+00	1.81E+00	na	—	7.4E+04	2.8E+04	na	—	1.74E+00	4.53E-01	na	—	1.8E+04	7.1E+03	na	—	1.8E+04	7.1E+03	na	—	—
Anthracene	0	—	—	na	1.1E+05	—	na	8.6E+08	—	na	1.1E+04	—	na	8.6E+07	—	na	—	—	na	—	8.6E+07	
Antimony	0	—	—	na	4.3E+03	—	na	3.4E+07	—	na	4.3E+02	—	na	3.4E+06	—	na	—	—	na	—	3.4E+06	
Arsenic	0	3.4E+02	1.5E+02	na	—	5.1E+05	9.3E+05	na	—	8.5E+01	3.8E+01	na	—	5.0E+05	2.3E+05	na	—	5.0E+05	2.3E+05	na	—	—
Barium	0	—	—	na	—	—	na	—	—	na	—	—	na	—	—	na	—	—	na	—	—	
Benzene c	0	—	—	na	7.1E+02	—	na	1.7E+07	—	na	7.1E+01	—	na	1.7E+06	—	na	—	—	na	—	1.7E+06	
Benzidine c	0	—	—	na	5.4E-03	—	na	1.3E+02	—	na	5.4E-04	—	na	1.3E+01	—	na	—	—	na	—	1.3E+01	
Benzo (a) anthracene c	0	—	—	na	4.9E-01	—	na	1.2E+04	—	na	4.9E-02	—	na	1.2E+03	—	na	—	—	na	—	1.2E+03	
Benzo (b) fluoranthene c	0	—	—	na	4.9E-01	—	na	1.2E+04	—	na	4.9E-02	—	na	1.2E+03	—	na	—	—	na	—	1.2E+03	
Benzo (k) fluoranthene c	0	—	—	na	4.9E-01	—	na	1.2E+04	—	na	4.9E-02	—	na	1.2E+03	—	na	—	—	na	—	1.2E+03	
Benzo (a) pyrene c	0	—	—	na	4.9E-01	—	na	1.2E+04	—	na	4.9E-02	—	na	1.2E+03	—	na	—	—	na	—	1.2E+03	
Bis(2-Chloroethyl) Ether	0	—	—	na	1.4E+01	—	na	1.1E+05	—	na	1.4E+00	—	na	1.1E+04	—	na	—	—	na	—	1.1E+04	
Bis(2-Chloroisopropyl) Ether	0	—	—	na	1.7E+05	—	na	1.3E+09	—	na	1.7E+04	—	na	1.3E+08	—	na	—	—	na	—	1.3E+08	
Bromotинформ	0	—	—	na	3.6E+03	—	na	8.7E+07	—	na	3.6E+02	—	na	8.7E+06	—	na	—	—	na	—	8.7E+06	
ButylBenzylphthalate	0	—	—	na	5.2E+03	—	na	4.1E+07	—	na	5.2E+02	—	na	4.1E+06	—	na	—	—	na	—	4.1E+06	
Cadmium	0	1.8E+00	6.6E-01	na	—	2.7E+03	4.1E+03	na	—	4.5E-01	1.6E-01	na	—	2.6E+03	1.0E+03	na	—	2.6E+03	1.0E+03	na	—	
Carbon Tetrachloride c	0	—	—	na	4.4E+01	—	na	1.1E+06	—	na	4.4E+00	—	na	1.1E+05	—	na	—	—	na	—	1.1E+05	
Chlordane c	0	2.4E+00	4.3E-03	na	2.2E-02	3.6E+03	2.7E+01	na	5.3E+02	6.0E-01	1.1E-03	na	2.2E-03	3.5E+03	6.7E+00	na	5.3E+01	3.5E+03	6.7E+00	na	5.3E+01	
Chloride	0	8.6E+05	2.3E+05	na	—	1.3E+09	1.4E+09	na	—	2.2E+05	5.8E+04	na	—	1.3E+09	3.6E+08	na	—	1.3E+09	3.6E+08	na	—	
TRC	0	1.9E+01	1.1E+01	na	—	2.9E+04	6.8E+04	na	—	4.8E+00	2.8E+00	na	—	2.8E+04	1.7E+04	na	—	2.8E+04	1.7E+04	na	—	
Chlorobenzene	0	—	—	na	2.1E+04	—	na	1.6E+08	—	na	2.1E+03	—	na	1.6E+07	—	na	—	—	na	—	1.6E+07	

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Parameter	Background	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	
(ug/l unless noted)																		
Chlorodibromomethane ^c	0	--	--	--	na	3.4E+02	--	--	na	8.2E+06	--	--	na	8.2E+05	--	--	na	
Chloroform ^c	0	--	--	--	na	2.9E+04	--	--	na	7.0E+08	--	--	na	7.0E+07	--	--	na	
2-Chloronaphthalene	0	--	--	--	na	4.3E+03	--	--	na	3.4E+07	--	--	na	3.4E+06	--	--	na	
2-Chlorophenol	0	--	--	--	na	4.0E+02	--	--	na	3.1E+06	--	--	na	4.0E+01	--	--	na	
Chloropyfrifos	0	8.3E-02	4.1E-02	na	--	1.2E+02	2.5E+02	na	--	2.1E-02	1.0E-02	na	--	1.2E+02	6.4E+01	--	--	na
Chromium III	0	3.2E+02	4.2E+01	na	--	4.9E+05	2.6E+05	na	--	8.1E+01	1.1E+01	na	--	4.8E+05	6.5E+04	--	--	na
Chromium VI	0	1.6E+01	1.1E+01	na	--	2.4E+04	6.8E+04	na	--	4.0E+00	2.8E+00	na	--	2.4E+04	1.7E+04	--	--	na
Chromium, Total	0	--	--	--	na	--	--	--	na	1.2E+04	--	--	na	1.2E+03	--	--	na	
Chrysene ^c	0	--	--	--	na	4.9E-01	--	--	na	1.2E+04	--	--	na	1.0E+04	7.7E+03	--	--	na
Copper	0	--	--	--	na	1.1E+04	3.1E+04	na	--	1.7E+00	1.2E+00	na	--	1.0E+04	7.7E+03	--	--	na
Cyanide	0	7.0E+00	5.0E+00	na	--	2.2E+05	3.3E+04	3.2E+04	na	1.7E+09	5.5E+09	1.3E+00	na	2.2E+04	3.2E+04	8.1E+03	--	1.7E+08
DDD ^c	0	--	--	--	na	8.4E-03	--	--	na	2.0E+02	--	--	na	8.4E-04	--	--	na	
DDE ^c	0	--	--	--	na	5.9E-03	--	--	na	1.4E+02	--	--	na	5.9E-04	--	--	na	
DDT ^c	0	--	--	--	na	5.9E-03	1.7E+03	6.2E+00	na	1.4E+02	2.8E-01	2.5E-04	na	5.9E-04	1.6E+03	1.6E+00	--	1.4E+01
Demeton	0	--	1.0E-03	na	--	1.0E-01	--	--	na	6.2E+02	--	--	na	2.5E-02	--	--	na	
Dibenz(a,h)anthracene ^c	0	--	--	--	na	4.9E-01	--	--	na	1.2E+04	--	--	na	4.9E-02	--	--	na	
Diethyl phthalate	0	--	--	--	na	1.2E+04	--	--	na	9.4E+07	--	--	na	1.2E+03	--	--	na	
Dichloromethane	0	--	--	--	na	1.0E-03	--	--	na	6.2E+00	--	--	na	1.2E+03	--	--	na	
(Methylene Chloride) ^c	0	--	--	--	na	1.6E+04	--	--	na	3.9E+08	--	--	na	1.6E+03	--	--	na	
1,2-Dichlorobenzene	0	--	--	--	na	1.7E+04	--	--	na	1.3E+08	--	--	na	1.7E+03	--	--	na	
1,3-Dichlorobenzene	0	--	--	--	na	2.6E+03	--	--	na	2.0E+07	--	--	na	2.6E+02	--	--	na	
1,4-Dichlorobenzene	0	--	--	--	na	2.6E+03	--	--	na	2.0E+07	--	--	na	2.6E+02	--	--	na	
3,3-Dichlorobenzidine ^c	0	--	--	--	na	7.7E-01	--	--	na	1.9E-04	--	--	na	7.7E-02	--	--	na	
Dichlorobromomethane ^c	0	--	--	--	na	4.6E+02	--	--	na	1.1E+07	--	--	na	4.6E+01	--	--	na	
1,2-Dichloroethane ^c	0	--	--	--	na	9.9E+02	--	--	na	2.4E+07	--	--	na	9.9E+01	--	--	na	
1,1-Dichloroethylene	0	--	--	--	na	1.7E+04	--	--	na	1.3E+08	--	--	na	1.7E+03	--	--	na	
1,2-trans-dichloroethylene	0	--	--	--	na	1.4E+05	--	--	na	1.1E+09	--	--	na	1.4E+04	--	--	na	
2,4-Dichlorophenol	0	--	--	--	na	7.9E+02	--	--	na	6.2E+06	--	--	na	7.9E+01	--	--	na	
acetic acid (2,4-D)	0	--	--	--	na	--	--	--	na	--	--	na	--	--	--	--	na	
1,2-Dichloropropane ^c	0	--	--	--	na	3.9E+02	--	--	na	9.5E+06	--	--	na	3.9E+01	--	--	na	
1,3-Dichloropropene	0	--	--	--	na	1.7E+03	--	--	na	1.3E+07	--	--	na	1.7E+02	--	--	na	
Dieidrin ^c	0	2.4E-01	5.6E-02	na	1.4E-03	3.6E+02	3.5E+02	na	3.4E+01	6.0E-02	1.4E-02	na	1.4E-04	3.5E+02	8.7E+01	--	1.3E-06	
Diethyl Phthalate	0	--	--	--	na	1.2E+05	--	--	na	9.4E+08	--	--	na	1.2E+04	--	--	na	
Di-2-Ethylhexyl Phthalate ^c	0	--	--	--	na	5.9E+01	--	--	na	1.4E+06	--	--	na	5.9E+00	--	--	na	
2,4-Dimethylphenol	0	--	--	--	na	2.3E+03	--	--	na	1.8E+07	--	--	na	2.3E+02	--	--	na	
Dimethyl Phthalate	0	--	--	--	na	2.9E+06	--	--	na	2.3E+10	--	--	na	2.9E+05	--	--	na	
Di-n-Butyl Phthalate	0	--	--	--	na	1.2E+04	--	--	na	9.4E+07	--	--	na	1.2E+03	--	--	na	
2,4-Dinitrophenol	0	--	--	--	na	1.4E+04	--	--	na	1.1E+08	--	--	na	1.4E+03	--	--	na	
2-Methyl,4,6-Dinitrophenol	0	--	--	--	na	7.65E+02	--	--	na	6.0E+06	--	--	na	7.7E+01	--	--	na	
2,4-Dinitrotoluene ^c	0	--	--	--	na	9.1E+01	--	--	na	2.2E+06	--	--	na	9.1E+00	--	--	na	
Dioxin (2,3,7,8-tetrachlorodibenzo-p-dioxin)	0	--	--	--	na	1.2E+06	--	--	na	--	--	na	1.2E-07	--	--	na		
1,2-Diphenylhydrazine ^c	0	--	--	--	na	5.4E+00	--	--	na	1.3E+05	--	--	na	5.4E-01	--	--	na	
Alpha-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	3.3E+02	3.5E+02	na	1.9E+06	5.5E-02	1.4E-02	na	2.4E+01	3.2E+02	8.7E+01	--	1.3E-04	
Beta-Endosulfan	0	2.2E-01	5.6E-02	na	2.4E+02	3.3E+02	3.5E+02	na	1.9E+06	5.5E-02	1.4E-02	na	2.4E+01	3.2E+02	8.7E+01	--	1.9E-05	
Endosulfan Sulfate	0	--	--	--	na	2.4E+02	--	--	na	1.9E+06	--	--	na	2.4E+01	3.2E+02	8.7E+01	--	1.9E-05
Endrin	0	8.6E-02	3.6E-02	na	8.1E-01	1.3E+02	2.2E+02	na	6.3E+03	2.2E-02	9.0E-03	na	8.1E-02	1.3E+02	5.6E+01	--	1.9E-05	
Endrin Alddehyde	0	--	--	--	na	8.1E-01	--	--	na	6.3E+03	--	--	na	8.1E-02	--	--	na	

Parameter	Background	Water Quality Criteria				WasteLoad Allocations				Antidegradation Baseline				Antidegradation Allocations				Most Limiting Allocations				
		Conc.	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH				
Ethylbenzene	0	-	-	-	na	2.9E+04	-	-	na	2.3E+08	-	-	na	2.9E+03	-	-	na	2.3E+07	-	-	2.3E+07	
Fluoranthene	0	-	-	-	na	3.7E+02	-	-	na	2.9E+06	-	-	na	2.9E+05	-	-	na	2.9E+05	-	-	2.9E+05	
Fluorene	0	-	-	-	na	1.4E+04	-	-	na	1.1E+08	-	-	na	1.4E+03	-	-	na	1.1E+07	-	-	1.1E+07	
Foaming Agents	0	-	-	-	na	-	-	-	na	-	-	na	-	-	-	-	na	-	-	-	-	
Guthion	0	-	1.0E-02	na	-	-	-	-	na	6.2E+01	na	-	na	2.5E+03	na	-	na	1.6E+01	na	-	1.6E+01	
Heptachlor	c	5.2E-01	3.8E-03	na	2.1E-03	7.8E+02	2.4E+01	na	5.1E+01	1.3E-01	9.5E-04	na	2.1E-04	7.7E+02	5.9E+00	na	5.1E+00	7.7E+02	5.9E+00	na	5.1E+00	
Heptachlor Epoxide	c	5.2E-01	3.8E-03	na	1.1E-03	7.8E+02	2.4E+01	na	2.7E+01	1.3E-01	9.5E-04	na	1.1E-04	7.7E+02	5.9E+00	na	2.7E+00	7.7E+02	5.9E+00	na	2.7E+00	
Hexachlorobenzene	c	0	-	-	na	7.7E-03	-	-	na	1.9E+02	-	-	na	7.7E-04	-	-	na	1.9E+01	-	-	1.9E+01	
Hexachlorobutadiene	c	0	-	-	na	5.0E+02	-	-	na	1.2E+07	-	-	na	5.0E+01	-	-	na	1.2E+06	-	-	1.2E+06	
Hexachlorocyclohexane	0	-	-	-	na	1.3E-01	-	-	na	3.2E+03	-	-	na	1.3E-02	-	-	na	3.2E+02	-	-	3.2E+02	
Alpha-BHC	c	0	-	-	na	4.6E-01	-	-	na	1.1E+04	-	-	na	4.6E-02	-	-	na	1.1E+03	-	-	1.1E+03	
Hexachlorocyclohexane	Beta-BHC	c	0	-	-	na	6.3E-01	1.4E+03	-	na	1.5E+04	2.4E-01	-	na	6.3E-02	1.4E+03	-	na	1.5E+03	-	-	1.5E+03
Hexachlorocyclohexane	Gamma-BHC	(Lindane)	0	9.5E-01	na	na	6.3E-01	1.4E+03	-	na	1.5E+04	2.4E-01	-	na	1.5E+03	1.4E+03	-	na	1.5E+03	-	-	1.5E+03
Hexachlorocyclopentadiene	0	-	-	-	na	1.7E+04	-	-	na	1.3E+08	-	-	na	1.7E+03	-	-	na	1.3E+07	-	-	1.3E+07	
Hexachloroethane	c	0	-	-	na	8.9E+01	-	-	na	2.2E+06	-	-	na	8.9E+00	-	-	na	2.2E+05	-	-	2.2E+05	
Hydrogen Sulfide	0	-	2.0E+00	na	-	-	-	-	na	1.2E+04	na	-	na	5.0E-01	na	-	na	3.1E+03	na	-	-	
Indeno (1,2,3-cd) pyrene	c	0	-	-	na	4.9E-01	-	-	na	1.2E+04	-	-	na	4.9E-02	-	-	na	1.2E+03	-	-	1.2E+03	
Iron	0	-	-	-	na	2.6E+04	-	-	na	6.3E+08	-	-	na	2.6E+03	-	-	na	6.3E+07	-	-	6.3E+07	
Isophorone	c	0	-	-	na	0.05E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	
Kepone	0	-	4.9E+01	5.6E+00	na	-	7.4E+04	3.5E+04	na	-	1.2E+01	1.4E+00	na	-	7.3E+04	8.7E+03	na	-	7.3E+04	8.7E+03	na	
Lead	0	-	1.0E-01	na	-	-	6.2E+02	na	-	2.5E-02	na	-	-	0.0E+00	na	-	-	1.6E+02	na	-	-	
Maiathion	0	-	0.05E+00	na	-	-	0.0E+00	na	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	
Manganese	0	-	1.4E+00	7.7E-01	na	5.1E-02	2.1E-03	4.8E+03	na	4.0E+02	3.5E-01	1.9E-01	na	5.1E-03	2.1E+03	1.2E+03	na	4.0E+01	2.1E+03	1.2E+03	na	
Mercury	0	-	4.0E+03	1.1E-01	na	4.6E+03	1.5E+03	7.0E+04	na	3.1E+07	-	-	na	4.0E+02	1.5E+02	1.7E+04	na	3.1E+06	1.5E+06	1.7E+04	na	
Methyl Bromide	0	-	3.0E-02	na	-	-	1.9E+02	na	-	7.5E-03	na	-	-	4.7E+01	na	-	-	4.7E+01	na	-	-	
Methoxychlor	0	-	0.0E+00	na	-	-	0.0E+00	na	-	0.0E+00	na	-	-	0.0E+00	na	-	-	0.0E+00	na	-	-	
Mirex	0	-	2.1E+04	-	na	-	1.6E+08	-	na	1.6E+08	-	-	na	2.1E+03	-	-	na	1.6E+07	-	-	1.6E+07	
Monochlorobenzene	0	1.0E+02	1.1E+01	na	-	-	3.6E+07	2.5E+01	na	4.6E+02	1.5E+05	1.7E+04	na	3.6E+06	1.5E+06	1.7E+04	na	3.6E+06	1.5E+06	1.7E+04	na	
Nickel	0	-	-	-	na	-	-	-	na	-	-	na	-	-	-	na	-	-	-	-	-	
Nitrate (as N)	0	-	-	-	na	1.9E+03	-	-	na	1.5E+07	-	-	na	1.9E+02	-	-	na	1.5E+06	-	-	1.5E+06	
Nitrobenzene	0	-	-	-	na	8.1E+01	-	-	na	2.0E+06	-	-	na	8.1E+00	-	-	na	2.0E+05	-	-	2.0E+05	
N-Nitrosodimethylamine	c	0	-	-	na	1.6E+02	-	-	na	3.9E+06	-	-	na	1.6E+01	-	-	na	3.9E+05	-	-	3.9E+05	
N-Nitrosodiphenylamine	c	0	-	-	na	1.4E+01	-	-	na	3.4E+05	-	-	na	1.4E+00	-	-	na	3.4E+04	-	-	3.4E+04	
Parathion	0	-	1.3E-02	na	-	9.8E+01	8.1E+01	na	-	1.6E-02	3.3E-03	na	-	9.6E+01	2.0E+01	na	-	9.6E+01	2.0E+01	na	-	
PCB-1016	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1221	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1232	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1242	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1248	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1254	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB-1250	0	-	1.4E-02	na	-	-	8.7E+01	na	-	-	3.5E-03	na	-	-	2.2E+01	na	-	-	2.2E+01	na	-	
PCB Total	c	0	-	-	na	1.7E-03	-	-	na	4.1E+01	-	-	na	1.7E-04	-	-	na	4.1E+00	-	-	4.1E+00	

Parameter (ug/l unless noted)	Background Conc.	Water Quality Criteria			Wasteload Allocations			Antidegradation Baseline			Antidegradation Allocations			Most Limiting Allocations			
		Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH	Acute	Chronic	HH (PWS)	HH
Pentachlorophenol c	0	9.6E+00	7.4E+00	na	8.2E+01	1.5E+04	4.6E+04	na	2.0E+06	2.4E+00	1.8E+00	na	8.2E+00	1.4E+04	1.1E+04	na	2.0E+05
Phenol	0	-	-	na	4.5E+06	--	--	na	3.6E+10	--	--	na	4.6E+05	--	--	na	3.6E+09
Pyrene	0	-	-	na	1.1E+04	--	--	na	8.6E+07	--	--	na	1.1E+03	--	--	na	8.6E+06
Radionuclides [pCi/l except Beta/Photon]	0	-	-	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Gross Alpha Activity	0	-	-	na	1.5E+01	--	--	na	1.2E+05	--	--	na	1.5E+00	--	--	na	1.2E+04
Beta and Photon Activity (mrem/yr)	0	-	-	na	4.0E+00	--	--	na	3.1E+04	--	--	na	4.0E+01	--	--	na	3.1E+03
Srniutium-89	0	-	-	na	8.0E+00	--	--	na	6.2E+04	--	--	na	8.0E+01	--	--	na	6.2E+03
Trilium	0	-	-	na	2.0E+04	--	--	na	1.6E+08	--	--	na	2.0E+03	--	--	na	1.6E+07
Selenium	0	2.0E+01	5.0E+00	na	1.1E+04	3.0E+04	3.1E+04	na	8.6E+07	5.0E+00	1.3E+00	na	1.1E+03	3.0E+04	7.8E+03	na	8.6E+06
Silver	0	1.0E+00	--	na	--	1.6E+03	--	na	--	2.6E+01	--	na	--	1.5E+03	--	na	--
Sulfate	0	-	-	na	--	--	--	na	--	--	--	na	--	--	--	na	--
1,1,2,2-Tetrachloroethane ^c	0	-	-	na	1.1E+02	--	--	na	2.7E+06	--	--	na	1.1E+01	--	--	na	2.7E+05
Tetrachloroethylene ^c	0	-	-	na	8.9E+01	--	--	na	2.2E+06	--	--	na	8.9E+00	--	--	na	2.2E+05
Thallium	0	-	-	na	6.3E+00	--	--	na	4.9E+04	--	--	na	6.3E+01	--	--	na	4.9E+03
Toluene	0	-	-	na	2.0E+05	--	--	na	1.6E+09	--	--	na	2.0E+04	--	--	na	1.6E+08
Total dissolved solids	0	-	-	na	--	--	--	na	--	--	--	na	--	--	--	na	--
Toxaphene ^c	0	7.3E+01	2.0E+04	na	7.5E+03	1.1E+03	1.2E+00	na	1.8E+02	5.0E+05	na	7.5E+04	1.1E+03	3.1E+01	na	1.8E+01	
Trityltin	0	4.6E+01	6.3E+02	na	--	6.9E+02	3.9E+02	na	--	1.2E+01	1.6E+02	na	--	6.8E+02	9.8E+01	na	--
1,2,4-Trichlorobenzene	0	-	-	na	9.4E+02	--	--	na	7.3E+06	--	--	na	9.4E+01	--	--	na	7.3E+05
1,1,2-Trichloroethane ^c	0	-	-	na	4.2E+02	--	--	na	1.0E+07	--	--	na	4.2E+01	--	--	na	1.0E+06
Trichloroethylene ^c	0	-	-	na	8.1E+02	--	--	na	2.0E+07	--	--	na	8.1E+01	--	--	na	2.0E+06
2,4,6-Trichlorophenol ^c	0	-	-	na	6.5E+01	--	--	na	1.6E+06	--	--	na	6.5E+00	--	--	na	1.6E+05
2-(2,4,5-Trichlorophenoxy) propionic acid (Silvex)	0	-	-	na	6.1E+01	--	--	na	1.5E+06	--	--	na	--	--	--	na	--
Vinyl Chloride ^c	0	-	-	na	6.6E+01	9.8E+04	4.1E+05	na	5.4E+08	1.6E+01	1.6E+01	na	6.9E+03	9.6E+04	1.0E+05	na	1.5E+05
Zinc	0	6.5E+01	6.6E+01	na	6.3E+04	9.8E+04	4.1E+05	na	5.4E+08	1.6E+01	1.6E+01	na	6.9E+03	9.6E+04	1.0E+05	na	5.4E+07

Notes:

- All concentrations expressed as micrograms/liter (ug/l), unless noted otherwise
- Discharge flow is highest monthly average or Form 2C maximum for Industries and design flow for Municipal
- Metals measured as Dissolved, unless specified otherwise
- "C" indicates a carcinogenic parameter
- Regular WLAs are mass balances (minus background concentration) using the % of stream flow entered above under Mixing Information. Antidegradation WLAs are based upon a complete mix.
- Antideg. Baseline = (0.25(WQC - background conc.) + background conc.) for acute and chronic
- WLAs established at the following stream flows: 1Q10 for Acute, 3Q10 for Chronic Ammonia, 7Q10 for Other Chronic, 3Q05 for Non-carcinogens, Harmonic Mean for Carcinogens, and Annual Average for Dioxin. Mixing ratios may be substituted for stream flows where appropriate.

Note: do not use QL's lower than the minimum QL's provided in agency guidance

Metal	Target Value (SSTV)
Antimony	3.4E+06
Arsenic	1.4E+05
Barium	na
Cadmium	6.1E+02
Chromium III	3.9E+04
Chromium VI	9.4E+03
Copper	4.1E+03
Iron	na
Lead	5.2E+03
Manganese	na
Mercury	4.0E+01
Nickel	1.0E+04
Selenium	4.7E+03
Silver	6.2E+02
Zinc	3.8E+04

0.020 MGD DISCHARGE FLOW - STREAM MIX PER "Mix.exe"

Discharge Flow Used for WQS-WLA Calculations (MGD)				0.020	Ammonia - Dry Season - Acute				Ammonia - Dry Season - Chronic				
Stream Flows		Total Mix Flows		90th Percentile pH (SU)	8.100	90th Percentile Temp. (deg C)		24.100	90th Percentile pH (SU)		8.100		
Dry Season	Allocated to Mix (MGD)	Wet Season	Stream + Discharge (MGD)	(7.204 - pH) (pH - 7.204)	-0.896	90th Percentile pH (SU)		8.100	MIN	MAX	1.537		
1Q10 30.090	212.000	30.110	212.020	N/A		Trout Present Criterion (mg N/L)	4.645		(7.688 - pH) (pH - 7.688)		24.100		
7Q10 124.000	N/A	124.020	N/A			Trout Absent Criterion (mg N/L)	6.954				-0.412		
30Q10 138.000	312.000	138.020	312.020			Trout Present?	n				0.412		
30Q5 156.000	N/A	156.020	N/A			Effective Criterion (mg N/L)	6.954						
Harm. Mean	485.000	N/A	485.020	N/A									
Annual Avg.	0.000	N/A	0.020	N/A									
Stream/Discharge Mix Values						Ammonia - Wet Season - Acute				Ammonia - Wet Season - Chronic			
Dry Season				24.099	16.800	90th Percentile pH (SU)	8.100		90th Percentile Temp. (deg C)	16.800			
1Q10 90th% Temp. Mix (deg C)		24.100	16.800			(7.204 - pH) (pH - 7.204)	-0.896		90th Percentile pH (SU)	8.100			
30Q10 90th% Temp. Mix (deg C)		8.100	8.100				0.896		MIN	2.460			
1Q10 90th% pH Mix (SU)		8.100	8.100			Trout Present Criterion (mg N/L)	4.641		MAX	16.800			
30Q10 90th% pH Mix (SU)		7.100	N/A			Trout Absent Criterion (mg N/L)	6.949		(7.688 - pH) (pH - 7.688)		-0.412		
1Q10 10th% pH Mix (SU)		7.100	N/A			Trout Present?	n				0.412		
7Q10 10th% pH Mix (SU)						Effective Criterion (mg N/L)	6.949						
1Q10 Hardness (mg/L as CaCO ₃)		50.0	50.0										
7Q10 Hardness (mg/L as CaCO ₃)		50.0	50.0										

0.020 MGD DISCHARGE FLOW - COMPLETE STREAM MIX

Discharge Flow Used for WQS-WLA Calculations (MGD)				0.020	Ammonia - Dry Season - Acute				Ammonia - Dry Season - Chronic				
100% Stream Flows		Total Mix Flows		90th Percentile pH (SU)	8.100	90th Percentile Temp. (deg C)		24.100	90th Percentile pH (SU)		8.100		
Dry Season	Allocated to Mix (MGD)	Wet Season	Stream + Discharge (MGD)	(7.204 - pH) (pH - 7.204)	-0.896	90th Percentile pH (SU)		8.100	MIN	MAX	1.537		
1Q10 118.000	212.000	118.020	212.020	N/A		Trout Present Criterion (mg N/L)	4.642		(7.688 - pH) (pH - 7.688)		24.100		
7Q10 124.000	N/A	124.020	N/A			Trout Absent Criterion (mg N/L)	6.950				-0.412		
30Q10 138.000	312.000	138.020	312.020			Trout Present?	n				0.412		
30Q5 156.000	N/A	156.020	N/A			Effective Criterion (mg N/L)	6.950						
Harm. Mean	485.000	N/A	485.020	N/A									
Annual Avg.	0.000	N/A	0.020	N/A									
Stream/Discharge Mix Values						Ammonia - Wet Season - Acute				Ammonia - Wet Season - Chronic			
Dry Season				24.100	16.800	90th Percentile pH (SU)	8.100		90th Percentile Temp. (deg C)	16.800			
1Q10 90th% Temp. Mix (deg C)		24.100	16.800			(7.204 - pH) (pH - 7.204)	-0.896		90th Percentile pH (SU)	8.100			
30Q10 90th% pH Mix (SU)		8.100	8.100				0.896		MIN	2.460			
1Q10 10th% pH Mix (SU)		7.100	N/A			Trout Present Criterion (mg N/L)	4.641		MAX	16.800			
7Q10 10th% pH Mix (SU)		7.100	N/A			Trout Absent Criterion (mg N/L)	6.949		(7.688 - pH) (pH - 7.688)		-0.412		
1Q10 Hardness (mg/L as CaCO ₃) =		50.000	50.000			Trout Present?	n				0.412		
7Q10 Hardness (mg/L as CaCO ₃) =		50.000	50.000			Effective Criterion (mg N/L)	6.949						

10/14/2015 9:35:17 AM

Facility = Glen Wilton WWTP

Chemical = ammonia (mg/L)

Chronic averaging period = 30

WL_{Aa} = 10000

WL_{Ac} = 2000

Q.L. = 0.2

samples/mo. = 1

samples/wk. = 1

Summary of Statistics:

observations = 1

Expected Value = 9

Variance = 29.16

C.V. = 0.6

97th percentile daily values = 21.9007

97th percentile 4 day average = 14.9741

97th percentile 30 day average= 10.8544

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

No Limit is required for this material

The data are:

9/30/2015 10:25:16 AM

Facility = Glen Wilton WWTP

Chemical = TRC (mg/L)

Chronic averaging period = 4

WLAa = 4

WLAc = 4

Q.L. = 0.2

samples/mo. = 30

samples/wk. = 8

Summary of Statistics:

observations = 1

Expected Value = 1000

Variance = 360000

C.V. = 0.6

97th percentile daily values = 2433.41

97th percentile 4 day average = 1663.79

97th percentile 30 day average= 1206.05

< Q.L. = 0

Model used = BPJ Assumptions, type 2 data

A limit is needed based on Acute Toxicity

Maximum Daily Limit = 4

Average Weekly limit = 2.38602034360889

Average Monthly LImit = 1.98248465547072

The data are:

1000

Attachment G

Reduced Monitoring Frequency Evaluation Memorandum

M E M O R A N D U M

DEPARTMENT OF ENVIRONMENTAL QUALITY
Blue Ridge Regional Office

3019 Peters Creek Road

Roanoke, VA 24019

SUBJECT: Justification for Reduced Monitoring Frequency
Reissuance of VPDES Permit No. VA0089273
Glen Wilton WWTP

TO: Permit File

FROM: Becky L. France, Water Permit Writer *B.L.F.*

DATE: September 30, 2015

Compliance History

The VPDES Permit Manual recommends effluent monitoring frequencies. Guidance Memo 98-2005 allows for reduced monitoring at facilities with excellent compliance histories. To qualify for consideration of reduced monitoring, the facility should not have been issued any Letter of Noncompliance (LON), Notice of Violation (NOV), Warning Letter, or be under any Consent Orders, Consent Decrees, Executive Compliance Agreements, or related enforcement documents during the past three years.

This facility has not been issued any Warning Letters or NOVs within the past three years. A compliance and laboratory inspection was conducted on November 15, 2011. There were no deficiencies noted with the general sampling and analysis section. Therefore, this facility qualifies for a reduced monitoring data evaluation.

Monitoring Data Evaluation

Discharge Monitoring Report (DMR) pH data from July 2012 through June 2015 pH and BOD₅ and TSS data from August 2010 through October 2015 have been summarized in the attached tables. A table of *E. coli* data from May 2011 through June 2015 has also been compiled. Total suspended solids (TSS), pH, biochemical oxygen demand (BOD₅), and *E. coli* have been considered for reduced monitoring. Total residual chlorine limits are not considered eligible for reduced monitoring to ensure protection of aquatic life and human health. The actual performance to permit limit ratios are summarized in the table that follows. Facilities with baseline monitoring that have an actual performance to permit limit ratio of greater than 75 percent are not eligible for reduced monitoring.

Table 1 **Performance to Permit Limit Ratios (DMR Data)**

Parameter	Actual Performance/ Permit Limit Monthly Average*	Actual Performance/ Permit Limit (Maximum)*	Reduced Monitoring
TSS	10 %, 5.2%	18%, 3.5%	1/ 6 Months
BOD ₅	4.0%, 0.62%	2.7%, 0.42%	1/ 6 Months
<i>E. coli</i>	--	--	1/Year
pH	--	--	1/Week

*The ratio based upon concentration is listed first, and the ratio based upon loading is listed second.

pH: None of the reported values were within 0.5 S.U. of the permit limits. The facility does not adjust pH through chemical addition. So, the pH monitoring frequency shall continue to be reduced to 1/week.

TSS and BOD₅: The DMR data are consistently well below the permit limits. According to Guidance Memo 98-2005, facilities with baseline monitoring that have an actual performance to permit limit ratio of less than 25 percent are eligible for a reduced monitoring frequency of 1 /6 months. This reduced monitoring frequency for BOD₅ and TSS has been continued from the previous permit.

E. coli: The *E. coli* data are consistently well below the permit limit of 126 cfu/100 mL. During the permit term, the highest *E. coli* value was 29 cfu/100 mL. Since the water quality data were significantly below the water quality criterion, the monitoring frequency has been reduced from 1/week to 1/year. In order to calculate a geometric mean, a total of four consecutive weekly samples are required.

The permit contains a special condition that will revert the TSS and BOD₅ monitoring frequencies back to 1/month, the pH monitoring frequency back to 1/day, and the *E. coli* back to 1/week if the permittee is issued a NOV.

Justification Memorandum for Reduced Monitoring
Glen Wilton WWTP (VA0089273)
Page 3 of 5

Table 2 TSS and BOD₅ Effluent Data

Justification Memorandum for Reduced Monitoring
 Glen Wilton WWTP (VA0089273)
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Table 3 pH Effluent Data

Date DMR Due	pH, min S.U.	H ion conc	pH, max S.U.	H ion conc
10-Aug-12	7.3	5.012E-08	7.5	3.162E-08
10-Sep-12	7.4	3.981E-08	7.5	3.162E-08
10-Oct-12	7.3	5.012E-08	7.5	3.162E-08
10-Nov-12	7.3	5.012E-08	7.4	3.981E-08
10-Dec-12	7.2	6.310E-08	7.3	5.012E-08
10-Jan-13	7.2	6.310E-08	7.7	1.995E-08
10-Feb-13	7.1	7.943E-08	7.5	3.162E-08
10-Mar-13	7.3	5.012E-08	7.7	1.995E-08
10-Apr-13	7.1	7.943E-08	7.8	1.585E-08
10-May-13	7.1	7.943E-08	7.3	5.012E-08
10-Jun-13	7.1	7.943E-08	7.3	5.012E-08
10-Jul-13	7.3	5.012E-08	7.7	1.995E-08
10-Aug-13	7.4	3.981E-08	7.7	1.995E-08
10-Sep-13	7.3	5.012E-08	7.4	3.981E-08
10-Oct-13	7.3	5.012E-08	7.4	3.981E-08
10-Nov-13	7.1	7.943E-08	7.9	1.259E-08
10-Dec-13	7	1.000E-07	7.4	3.981E-08
10-Jan-14	7	1.000E-07	7.2	6.310E-08
10-Feb-14	7.1	7.943E-08	7.3	5.012E-08
10-Mar-14	7	1.000E-07	7.2	6.310E-08
10-Apr-14	6.9	1.259E-07	7.1	7.943E-08
10-May-14	7	1.000E-07	7.5	3.162E-08
10-Jun-14	7.1	7.943E-08	7.5	3.162E-08
10-Jul-14	7.5	3.162E-08	7.8	1.585E-08
10-Aug-14	7.2	6.310E-08	7.5	3.162E-08
10-Sep-14	6.9	1.259E-07	7.1	7.943E-08
10-Oct-14	7	1.000E-07	7.1	7.943E-08
10-Nov-14	7.1	7.943E-08	7.3	5.012E-08
10-Dec-14	7.1	7.943E-08	7.7	1.995E-08
10-Jan-15	7	1.000E-07	7.6	2.512E-08
10-Feb-15	7	1.000E-07	7.8	1.585E-08
10-Mar-15	6.8	1.585E-07	7.2	6.310E-08
10-Apr-15	7	1.000E-07	7.5	3.162E-08
10-May-15	7	1.000E-07	7.4	3.981E-08
10-Jun-15	7	1.000E-07	7.2	6.310E-08
10-Jul-15	7	1.000E-07	7.2	6.310E-08
mean	7.2	6.140E-08	7.5	3.025E-08
maximum			7.9	
minimum	6.8			
permit limit	6.0	1.000E-06	9.0	1.000E-09

Justification Memorandum for Reduced Monitoring
Glen Wilton WWTP (VA0089273)
Page 5 of 5

Table 4 *E. coli* Effluent Data

Date Due	Geometric Mean (cfu/100 mL)
10-Jun-11	1
10-Jul-11	1
10-Aug-11	2
10-Sep-11	3
10-Oct-11	1
10-Nov-11	<1
10-Dec-11	<1
10-Jan-12	<1
10-Feb-12	3
10-Mar-12	<1
10-Apr-12	<1
10-May-12	1
10-Jun-12	<QL
10-Jul-12	15
10-Aug-12	<QL
10-Sep-12	2.3
10-Oct-12	0.5
10-Nov-12	0.4
10-Dec-12	0.25
10-Jan-13	2
10-Feb-13	1
10-Mar-13	29
10-Apr-13	2
10-May-13	0.6
10-Jun-13	0
10-Jul-13	0.25
10-Aug-13	0
10-Sep-13	0
10-Oct-13	0.55
10-Nov-13	0
10-Dec-13	0
10-Jan-14	0.2
10-Feb-14	0
10-Mar-14	0.075
10-Apr-14	0.075
10-May-14	1.21
10-Jun-14	0.584
10-Jul-14	0.119
10-Aug-14	0
10-Sep-14	0
10-Oct-14	0
10-Nov-14	0
10-Dec-14	0
10-Jan-15	0
10-Feb-15	0
10-Mar-15	0.79825
10-Apr-15	2
10-May-15	1
10-Jun-15	0
10-Jul-15	0

Attachment H

Regional Water Quality Model Output (Version 4.0)

REGIONAL MODELING SYSTEM VERSION 4.0
**Model Input File for the Discharge
to JAMES RIVER.**

File Information

File Name: C:\Users\pmp94864\Documents\Working files\BECKY\PERMITS\VPDES\G
Date Modified: October 13, 2015

Water Quality Standards Information

Stream Name: JAMES RIVER
River Basin: James River Basin
Section: 12
Class: IV - Mountainous Zones Waters
Special Standards: none

Background Flow Information

Gauge Used: James River Gauge 02016500
Gauge Drainage Area: 1371 Sq.Mi.
Gauge 7Q10 Flow: 123 MGD
Headwater Drainage Area: 1381 Sq.Mi.
Headwater 7Q10 Flow: 123.8972 MGD (Net; includes Withdrawals/Discharges)
Withdrawal/Discharges: 0 MGD
Incremental Flow in Segments: 8.971553E-02 MGD/Sq.Mi.

Background Water Quality

Background Temperature: 24.1 Degrees C
Background cBOD5: 2 mg/l
Background TKN: 0 mg/l
Background D.O.: 7.347231 mg/l

Model Segmentation

Number of Segments: 1
Model Start Elevation: 1000 ft above MSL
Model End Elevation: 960.4 ft above MSL

REGIONAL MODELING SYSTEM VERSION 4.0
Model Input File for the Discharge
to JAMES RIVER.

Segment Information for Segment 1

Definition Information

Segment Definition: A discharge enters.
Discharge Name: GLEN WILTON WWTP
VPDES Permit No.:

Discharger Flow Information

Flow: 0.02 MGD
cBOD5: 30 mg/l
TKN: 20 mg/l
D.O.: 0 mg/l
Temperature: 23 Degrees C

Geographic Information

Segment Length: 1 miles
Upstream Drainage Area: 1381 Sq.Mi.
Downstream Drainage Area: 0 Sq.Mi.
Upstream Elevation: 1000 Ft.
Downstream Elevation: 960.4 Ft.

Hydraulic Information

Segment Width: 150 Ft.
Segment Depth: 1.173 Ft.
Segment Velocity: 1.09 Ft./Sec.
Segment Flow: 123.917 MGD
Incremental Flow: -123.897 MGD (Applied at end of segment.)

Channel Information

Cross Section: Rectangular
Character: Moderately Meandering
Pool and Ripple: No
Bottom Type: Small Rock
Sludge: None
Plants: None
Algae: None

modout.txt

"Model Run For C:\Users\pmp94864\Documents\Working files\BECKY\PERMITS\VPDES\Glen Wilton WWTP\Reissuance 2016\Data\DO Model Glen Wilton 2016.mod On 10/13/2015 5:12:05 PM"

"Model is for JAMES RIVER."

"Model starts at the GLEN WILTON WWTP discharge."

"Background Data"

"7Q10", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
123.8972, 2, 0, 7.347, 24.1

"Discharge/Tributary Input Data for Segment 1"

"Flow", "cBOD5", "TKN", "DO", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
.02, 30, 20, , 0, 23

"Hydraulic Information for Segment 1"

"Length", "width", "Depth", "velocity"
"(mi)", "(ft)", "(ft)", "(ft/sec)"
1, 150, 1.173, 1.09

"Initial Mix Values for Segment 1"

"Flow", "DO", "cBOD", "nBOD", "DOSat", "Temp"
"(mgd)", "(mg/l)", "(mg/l)", "(mg/l)", "(mg/l)", "deg C"
123.9172, 7.346, 5.011, .012, 8.169, 24.09982

"Rate Constants for Segment 1. - (All units Per Day)"

"k1", "k1@T", "k2", "k2@T", "kn", "kn@T", "BD", "BD@T"
1, 1.207, 20, 22.042, .45, .617, 0, 0

"Output for Segment 1"

"Segment starts at GLEN WILTON WWTP"

"Total", "Segm."

"Dist.", "Dist.", "DO", "cBOD", "nBOD"
"(mi)", "(mi)", "(mg/l)", "(mg/l)", "(mg/l)"
0, 0, 7.346, 5.011, .012
.1, .1, 7.353, 5, .012
.2, .2, 7.353, 5, .012
.3, .3, 7.353, 5, .012
.4, .4, 7.353, 5, .012
.5, .5, 7.353, 5, .012
.6, .6, 7.353, 5, .012
.7, .7, 7.353, 5, .012
.8, .8, 7.353, 5, .012
.9, .9, 7.353, 5, .012
1, 1, 7.353, 5, .012

"END OF FILE"

Attachment I

Public Notice

PUBLIC NOTICE – Environmental Permit

PURPOSE OF NOTICE: To seek public comment on a draft permit from the Department of Environmental Quality that will allow the release of treated wastewater into a water body in Botetourt County, Virginia.

PUBLIC COMMENT PERIOD: 30 days following the public notice issue date

PERMIT NAME: Virginia Pollutant Discharge Elimination System Permit – Wastewater issued by DEQ, under the authority of the State Water Control Board

APPLICANT NAME, ADDRESS, AND PERMIT NUMBER: Western Virginia Water Authority, 1502 Brownlee Avenue, SE, Roanoke, VA 24014, VA0089273

FACILITY NAME AND LOCATION: Glen Wilton WWTP, 358 Railway Road, Glen Wilton, VA 24438

PROJECT DESCRIPTION: The Western Virginia Water Authority has applied for a reissuance of a permit for the public wastewater treatment plant. The applicant proposes to release treated sewage wastewater at a rate of 20,000 gallons per day from the current facility into a water body. The facility proposes to release the treated sewage into the James River in Botetourt County in the Upper James River/Sinking Creek/Mill Creek Watershed (VAW-I18R). A watershed is the land area drained by a river and its incoming streams. The permit will limit the following pollutants to amounts that protect water quality: organic matter, solids, toxic pollutants.

HOW TO COMMENT AND/OR REQUEST A PUBLIC HEARING: DEQ accepts comments and requests for public hearing by e-mail, fax, or postal mail. All comments and requests must be in writing and be received by DEQ during the comment period. Submittals must include the names, mailing addresses and telephone numbers of the commenter/requester and of all persons represented by the commenter/requester. A request for a public hearing must also include: 1) The reason why a public hearing is requested. 2) A brief, informal statement regarding the nature and extent of the interest of the requester or of those represented by the requestor, including how and extent such interest would be directly and adversely affected by the permit. 3) Specific references, where possible, to terms and conditions of the permit with suggested revisions. A public hearing may be held, including another comment period, if a public response is significant, based on individual requests for a public hearing, and there are substantial, disputed issues relevant to the permit.

CONTACT FOR PUBLIC COMMENTS, DOCUMENT REQUESTS, AND ADDITIONAL INFORMATION:

Becky L. France; **ADDRESS:** Virginia Department of Environmental Quality, Blue Ridge Regional Office, 3019 Peters Creek Road, Roanoke, VA 24019-2738; (540) 562-6700; **E-MAIL ADDRESS:** becky.france@deq.virginia.gov; **FAX:** (540) 562-6725. The public may review the draft permit and application at the DEQ office named above by appointment or may request copies of the documents from the contact person listed above.